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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LERNER, MARTIN

ART UNIT	PAPER NUMBER
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2654

DATE MAILED: 11/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/318,045

Applicant(s)

NEUHAUSER ET AL. 

Examiner

Martin Lerner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 to 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 to 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

This application has been filed with informal drawings which are acceptable for examination purposes only. The drawings contain many instances of hand lettering and hand numbering. Formal drawings will be required when the application is allowed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1 to 3, 7 to 9, 13, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by *Haartsen*.

Regarding independent claims 1 and 13, *Haartsen* discloses a system and method for detecting a symbol sequence, comprising:

“A system for decoding a predetermined message symbol of a plurality of message symbols embedded in an audio signal, the plurality of message symbols being contained within a predetermined message, the predetermined message symbol being represented by first and second code symbols displaced in time in the audio signal with at least one code symbol representing a different one of the message symbols positioned in time between the first and second code symbols” – a known symbol

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sequence SS ("a predetermined message") is used for synchronizing a transmitter 100 and a receiver 103 (column 5, lines 6 to 37: Figure 1); the application is for wireless digital communications systems, implicitly including voice signals for cellular telephones ("embedded in an audio signal") (column 1, lines 14 to 23); a known digital sequence is divided into a number of segments S_1, S_2, \dots, S_n ("a plurality of message symbols", "first code symbol", "second code symbol"), where each segment has a predetermined bit pattern (column 7, lines 19 to 60: Figures 4 to 7); in general, the bit patterns of segments S_1, S_2, \dots, S_n are each different from one another; for a time multiplex system (TDMA) (column 1, lines 16 to 17), the segments are displaced in time, with segment S_2 ("a different one of the message symbols") positioned in time between segments S_1 and S_3 ("the first and second code symbols") (Figures 4 to 7);

"means for accumulating a first signal value of the first code symbol representing the predetermined message symbol and a second signal value of the second code symbol representing the predetermined message symbol" – a summation value $a_1 + a_2$ of the correlation value a_1 of the first segment S_1 and of the correlation value of a_2 of the second segment S_2 are loaded into memory, and so on for each of the segments S_n and corresponding correlation values a_n (column 7, lines 27 to 36);

"means for examining the accumulated first and second signal values to detect the predetermined message symbol represented by the first and second code symbols" – a sync time pulse signal is generated only when all the segments are received and the sum of the correlation values a_1, a_2, \dots, a_n of the segments exceeds its corresponding threshold value TV_n (column 7, lines 36 to 45).

Regarding independent claim 16, *Haartsen* discloses a system for detecting a symbol sequence, comprising:

“A system for decoding a predetermined message symbol of a plurality of message symbols incorporated in an audio signal, the plurality of message symbols being contained within a predetermined message, the predetermined message symbol being represented by first and second code symbols displaced in time in the audio signal with at least one code symbol representing a different one of the message symbols positioned in time between the first and second code symbols” – a known symbol sequence SS (“a predetermined message”) is used for synchronizing a transmitter 100 and a receiver 103 (column 5, lines 6 to 37: Figure 1); the application is for wireless digital communications systems, implicitly including voice signals for cellular telephones (“incorporated in an audio signal”) (column 1, lines 14 to 23); a known digital sequence is divided into a number of segments S1, S2, . . . , Sn (“a plurality of message symbols”, “first code symbol”, “second code symbol”), where each segment has a predetermined bit pattern (column 7, lines 19 to 60: Figures 4 to 7); in general, the bit patterns of segments S1, S2, . . . , Sn are each different from one another; for a time multiplex system (TDMA) (column 1, lines 16 to 17), the segments are displaced in time, with segment S2 (“a different one of the message symbols”) positioned in time between segments S1 and S3 (“the first and second code symbols”) (Figures 4 to 7);

“an input device for receiving the first code symbol representing the predetermined message symbol and the second code symbol representing the

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predetermined message symbol” – correlator 300 receives segments S_1, S_2, \dots, S_n of known digital sequence SS (column 5, lines 6 to 16: Figure 1);

“a digital processor in communication with the input device to receive data therefrom representing the first and second code symbols, the digital processor being programmed to accumulate a first signal value representing the first code symbol and a second signal value representing the second code symbol, the digital processor being further programmed to examine the accumulated first and second signal values to detect the predetermined message symbol” – a summation value $a_1 + a_2$ of the correlation value a_1 of the first segment S_1 and of the correlation value of a_2 of the second segment S_2 are loaded into memory, and so on for each of the segments S_n and corresponding correlation values a_n (column 7, lines 27 to 36); a sync time pulse signal is generated only when all the segments are received and the sum of the correlation values a_1, a_2, \dots, a_n of the segments exceeds its corresponding threshold value TV_n (column 7, lines 36 to 45).

Regarding claim 2, *Haartsen* discloses a summation value $a_1 + a_2$ of the correlation value a_1 of the first segment S_1 and of the correlation value of a_2 of the second segment S_2 are loaded into memory, and so on for each of the segments S_n and corresponding correlation values a_n (column 7, lines 27 to 36); the summation $a_1 + a_2 + \dots + a_{(m-1)}$ is “a third signal value” derived from segment correlation value a_1 (“the first signal value”) and segment correlation value a_2 (“the second signal value”).

Regarding claim 3, a sum of the values of summation $a_1 + a_2 + \dots + a_{(m-1)}$ is a linear combination of the values $a_1, a_2, \dots, a_{(m-1)}$ for each of the segments.

Regarding claim 7, *Haartsen* discloses the correlation values are loaded into memory (column 7, lines 27 to 30); a sync time pulse signal is generated only when the summation value exceeds the threshold value TV_n for each of the segments (column 7, lines 30 to 40); thus, all of the values $a_1, a_2, \dots, a_{(m-1)}$ must be examined.

Regarding claim 8, *Haartsen* discloses the correlation is effected segment-wise for each of the bits in the segment ("based on multiple other signal values") (Figures 4 to 7).

Regarding claim 9, *Haartsen* discloses a time multiplex system (TDMA) (column 1, lines 16 to 17), where the segments are displaced in time, and the sequence of segments S_1, S_2, \dots, S_n in known symbol sequence SS repeats during synchronization.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4 to 6, 10 to 12, 14, 15, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Haartsen* in view of *Jensen et al.* ('490).

Haartsen discloses a system and method for detecting a symbol sequence, where the symbol sequence is a time multiplex system of a plurality of segments, each containing a plurality of bits. Although *Haartsen* suggests application to frequency hopp systems (FHSS) (column 1, lines 14 to 23), only segments containing bits are disclosed for the symbols and not frequency components. Also, *Haartsen* is concerned with detecting symbols for purposes of synchronization, and does not disclose transducing an audio signal to an electrical signal, or a housing carried on the person of an audience member for transmitting stored data for use in producing audience estimates.

However, *Jensen et al.* ('490) discloses a related method and system for decoding symbols in audio signals, where each of the symbols is representing by a unique set of code frequency components. The symbol S is represented by a first unique group of ten code frequency components f_1 through f_{10} ; the symbol E is represented by a second unique group of ten code frequency components f_1 through f_{10} ; the symbol 0 is represented by a further unique group of ten code frequency components f_1 through f_{10} ; and the symbol 1 is represented by a further unique group of ten code frequency components f_1 through f_{10} (column 10, line 59 to column 11, line 32: Figure 4). *Jensen et al.* ('490) accumulates and correlates values of the frequency components in a manner analogous to the accumulation and correlation of segment values in *Haartsen*. Basically, the symbol decoder of *Jensen et al.* ('490) is just an analogous way of encoding and decoding symbols as compared to *Haartsen*, with the

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symbols values being based on values of frequency components instead of values of bits in a segment. Also, *Jensen et al.* ('490) discloses an application of this system to a housing 382 which is sufficiently small in size to be carried on the person of an audience member participating in an audience estimate survey (column 27, lines 34 to 48; column 28, lines 6 to 13: Figure 17).

It would have been obvious to one of ordinary skill in the art to utilize frequency components for message symbols as taught by *Jensen et al.* ('490) in the time multiplex system of *Haartsen* for the purpose of producing audience estimates because *Haartsen* and *Jensen et al.* ('490) represent analogous ways of coding/decoding symbols in time and frequency domains, respectively.

Concerning claim 4, *Jensen et al.* ('490) discloses amplitude adjustment factors which serve to adjust the amplitudes of the various code frequency components; amplitudes of the relative frequency components are adjusted so that they will be masked during encoding to be inaudible to human hearing (column 13, lines 23 to 53); the adjusted amplitudes at the decoder are also non-linear functions of the original amplitudes because the amplitudes at the encoder are non-linear functions of the original amplitudes; *Jensen et al.* ('490) discloses that the signal amplitudes may be measured as an integration, root-mean-square or relative discrete value to evaluate masking ability (column 7, lines 27 to 38); at least the root-mean-square is a "non-linear function" of the original amplitude.

Concerning claim 5, *Jensen et al.* ('490) discloses that each of the symbols is representing by a unique set of code frequency components; the symbol S is

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represented by a first unique group of ten code frequency components f_1 through f_{10} ; the symbol E is represented by a second unique group of ten code frequency components f_1 through f_{10} ; the symbol 0 is represented by a further unique group of ten code frequency components f_1 through f_{10} ; and the symbol 1 is represented by a further unique group of ten code frequency components f_1 through f_{10} ; (column 10, line 59 to column 11, line 32: Figure 4); a noise level estimate is carried out around each frequency component bin in which a code component can occur; once the noise level for the bin of interest has been estimated, a signal-to-noise ratio for that bin $SNR(j)$ ("component value" "characteristic of a respective frequency component") is estimated by dividing the energy level $B(j)$ in the bin of interest by the estimated noise level $NS(j)$ (column 20, line 43 to column 21, line 22).

Concerning claim 6, *Jensen et al.* ('490) discloses that symbol detection intervals for the decoders may be established based on the timing of synchronization symbols transmitted with each encoded message and have a predetermined order; the decoders are operative initially to search for the presence of the first anticipated synchronization symbol, that is, the encoded E symbol which is transmitted during the predetermined period and determine its transmission interval; the decoders search for the presence of code components characterizing the symbol S, and when it is detected, the decoders determine its transmission interval; from this point, the detection of each of the data bits symbols are set (column 26, lines 35 to 59); "S" and "E" are synchronization ("marker") symbols and "1" and "0" are data symbols (column 10, lines 40 to 58: Figure 4).

Concerning claim 10, *Jensen et al.* ('490) discloses that each of the symbols is representing by a unique set of code frequency components; the symbol S is represented by a first unique group of ten code frequency components f_1 through f_{10} ; the symbol E is represented by a second unique group of ten code frequency components f_1 through f_{10} ; the symbol 0 is represented by a further unique group of ten code frequency components f_1 through f_{10} ; and the symbol 1 is represented by a further unique group of ten code frequency components f_1 through f_{10} ; (column 10, line 59 to column 11, line 32: Figure 4); a noise level estimate is carried out around each frequency component bin in which a code component can occur; once the noise level for the bin of interest has been estimated, a signal-to-noise ratio for that bin $SNR(j)$ ("component value" "characteristic of a respective frequency component") is estimated by dividing the energy level $B(j)$ in the bin of interest by the estimated noise level $NS(j)$ (column 20, line 43 to column 21, line 22).

Concerning claims 11, 14 and 17, *Jensen et al.* ('490) discloses that a decoder includes an input terminal for receiving the audio signal which may be a signal picked up from a microphone ("acoustic transducer")(column 19, lines 57 to 67: Figure 11); a digital signal processor 266 is coupled to memory 270 for storing the detected code symbols (column 21, lines 34 to 45: Figure 11).

Concerning claims 12, 15 and 18, *Jensen et al.* ('490) discloses that the system may be enclosed in a housing 382 which is sufficiently small in size to be carried on the person of an audience member participating in an audience estimate survey (column 27, lines 34 to 48; column 28, lines 6 to 13: Figure 17).

Response to Arguments

Applicants' arguments have been considered but are moot in view of the new grounds of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure.

LeFever discloses a related technique for detecting synchronization symbols.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (703) 308-9064. The examiner can normally be reached on 9:30 AM to 6:00 PM Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on (703) 305-4379. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

me

ml
November 14, 2002

Marsha D Banks-Harold
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